

Using Social Mindtools As a New Instructional Approach

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Abstract: This paper documents the results of an action research study focused on evaluating the effectiveness of using Webspiration, a visual learning Web 2.0 social mind-tool, to foster collaboration among ninth and tenth grade geometry students in a private high school in Hawaii. Field notes and observations, daily reflections, a whole group discussion, and a post attitudinal survey were used to collect data. Students applied proven learning methods such as webbing, mind-mapping, and diagramming to plan and organize ideas, visually communicate concepts, gather and keep track of research information, and think through projects and assignments. Classroom observations and feedback revealed that students were initially receptive and positive towards using an online tool to collaborate anytime anywhere; however, challenges with navigating through the menu bar and building content in real-time decreased motivation and intrinsic engagement. Future plans call for an increase in instructional class minutes to explore and navigate through unfamiliar software as well as to revisit the instructional approach. Despite several setbacks, this action research yielded valuable feedback that could assist the researcher and other educators in the integration of visual learning Web 2.0 social mindtools throughout various content areas.

Introduction

Through innovative uses of technology, multimedia software and other online resources, educators can make available an environment that seeks to motivate, cultivate, and meet the needs of the 21st century learner (Belderrain, 2006). Emerging technologies such as Webspiration, Google docs, wikis, blogs, and social software applications can support a stronger learning community of students that build mastery of content and develop problem solving-skills not bound by time or place. These technologies still allow for interaction between teacher and peers (Beldarrain, 2006). Rationale for incorporating Web 2.0 tools for students is confirmed by the ability for anyone to publish, share content, and easily collaborate with others (Eckstein, 2009).

Traditionally, technology has been used as media for delivering instruction, that is, as a means to convey information, tutor, and test students. Finding the right electronic environment that is not used solely to didactically instruct learners, but rather uses knowledge construction tools that students learn *with*, not *from*, can be a challenge. Literature suggests using mindtools in education. Mindtools are cognitive tools, such as selected computer programs, that stimulate learning and thinking in students (Nuutinen,

Sutinen, Botha, & Kommers, 2010). According to author Patty Kohler, “Research clearly indicates that brain activity is enhanced when we use and teach our students to represent information in a visual way” (Kohler, 2009, p.1).

Webs, diagrams, and concept maps are visually rich formats that help students and instructors organize, communicate, and share their understanding of a particular topic or concept. Because most available mind-tools do not promote collaboration, several researchers (Nuutinen, Sutinen, Botha, & Kommers, 2010, p.753) have proposed a need for “social mind-tools that are meant to facilitate and scaffold shared processes of cognition in order to achieve a common goal or product in a group of community of learners.” The potential of Webspiration compared to other text-oriented Web 2.0 tools such as wikis and Google docs, is that Webspiration supports online diagramming, dynamic construction of graphic maps, and collaboration among students and teachers. Therefore, the purpose of this action research study was to evaluate the effectiveness of using a visual learning Web 2.0 tool, Webspiration Classroom, to foster collaboration among ninth and tenth grade geometry students in a private high school in Hawaii. The researcher used action research as a practical approach to professional inquiry to understand, reflect, and improve one’s practice.

Project Description

Background

This action research study focused on evaluating the effectiveness of using an online, visual thinking tool to foster collaboration amongst ninth and tenth grade geometry students. Learners navigated the web to conduct research on the principles of trigonometry and how these mathematical facts were used in various “real world” applications. They met in Webspiration and collaboratively organized their research notes and facts, linked graphics and words, brainstormed ideas, communicated in real-time, and showed how pieces of information and/or ideas were related. In this digital learning environment students used webbing and diagramming to display visual models versus text heavy material. They illustrated their processes of cognition and shared areas of interest both individually and as group. At their leisure, anytime anywhere, students perused various groups’ web and concept designed documents. The asynchronous peer review process facilitated a safe environment to share constructive feedback. The students used their diagrams, webs, and concept maps to identify one practical application of trig and explained it to the class via a multimedia presentation.

The researcher designed the instructional approach to expose students to technology that might be more engaging and to incorporate social aspects that would promote positive and appropriate use of technology. Through the use of Webspiration the researcher hoped to integrate other content areas such as reading, researching, online publishing, and multimedia creation.

With these goals in mind, the following questions guided this study:

- 1) What are the student's attitudes towards Webspiration as a likeable tool?
- 2) What are the student's attitudes towards using Webspiration as an effective Web 2.0 tool to foster collaboration?
- 3) Will the students' perceive Webspiration as a tool they would continue to use in other content areas?

Research Information and Project Participants

The researcher of this study is a geometry classroom teacher at a private high school in Hawaii. The participants consisted of 19 ninth and tenth grade students between 13 and 15 years of age. Of the 19 students, 9 were females and 10 were males. The students are all part of a heterogeneous, diverse ethnic community of learners in a general education classroom.

Technology Skills and Instructional Materials

All students at this private high school are part of a one-to-one laptop program. Each student has been equipped with a Mac Air computer, which includes purchased software by the school such as, Geometers Sketchpad, Inspiration, Microsoft Office, Camtasia, and iBooks Author. Subsequently, students are required to complete online learning modules to learn how to update software, care for hardware, and engage in appropriate online behavior. Technology 101 is also a mandated course with the purpose of familiarizing students with basic computer skills. The entire campus is outfitted with unlimited access to the Internet.

Webspiration Procedures

In anticipation of the challenges when learning to navigate through new technology, the first pre-lesson was on November 3, 2012, where no data was collected. The students were introduced to Inspiration, a popular concept mapping software application being used in today's schools to "teach" students in much the same way that educators "teach" students. Students engaged in a hands-on activity centered on creating webs and mind maps that included images, text, and hyperlinks to connect key ideas of previously learned content. By exposing students to this technology prior to the implementation of the action research study, the researcher would be able to focus on recording observations and field notes rather than assisting students with learning new software.

Initial implementation began with instruction centered on students learning how to navigate within the Webspiration landscape. They learned how to log-in, create a new password, identify key functions of the toolbar, locate student help resources, use the chat feature, explore templates, develop a document, and share a document with both their peers as well as their teacher. A Math About Me activity was used as a means to build an online community, explore various subject templates, navigate through the toolbars, and investigate the real-time capabilities.

Following that, students conducted research outside of class using teacher provided web resources to explore the connections between trigonometry and mathematical terms. In Webspiration they linked graphics to words to show special mathematical relationships among the sides and angles of right triangles and displayed various ways these relationships can be used. As a group, their authentic works included webs, diagrams, and concept maps that included illustrations of trigonometry vocabulary, real-world applications pertaining to web research, and brainstormed ideas in preparation for their multimedia project.

To conclude, students peer reviewed group webs, diagrams, and mind maps by posting comments and/or chatting messages that addressed these essential questions:

- What are the special mathematical relationships among the sides and angles of right triangles?
- What are some of the various ways these relationships can be used?

The project was conducted over a four-week period from January thru February.

Research Methods

Several methods were used to gather student feedback in order to adequately evaluate the effectiveness of using social mindtools to foster collaboration. Field notes and observations were collected based on verbal feedback from student commentary and interactions while using Webspiration, a silent class discussion was held using a microblogging backchannel social application, an online questionnaire was posted to all students, an anonymous attitudinal survey was conducted in class, comments and chatting responses were analyzed, and daily journal reflections by the teacher were recorded.

Field Notes and Observations

Field notes and subjective observations were taken. The researcher asked pre-determined questions to serve as a tool for understanding students' perceptions and attitudes. Focused group discussions were charted and used as another vehicle for collecting the "talk and thoughts" of students in the classroom to gain insight on how students experienced a new instructional approach. Both methodologies loomed similar trends pertaining to students preferences, dislikes, technology issues faced, ability to use the web-tool, and their attitudes and level of engagement.

Daily Reflection

A daily reflection journal was used after each class to associate more themes and trends that were not addressed by the other collection tools. It gave the researcher another opportunity to identify challenges and successes that may have not been recorded during classroom instruction. Most importantly, it was used as an instrument to articulate changes to instructional plans.

Analysis of Student's Posts (comments, chats, peer review)

Online comments and chats were continuously monitored through the peer review process. Both the teacher and students provided feedback to each other via the comments and chatting features throughout the research project.

Online Synchronous Chatting/Web Survey

The researcher elicited student feedback by using a microblogging and social application, **Today'sMeet.com** (<http://learnitin5.com/>). Open-ended questions were posted on this easy-to-use interface that backchannels online discussion on one web page. In addition, an online survey questionnaire was crafted to gauge students' attitudes and perceptions towards the effectiveness of using Webspiration in fostering collaboration as well as performing as a pre-writing visual thinking tool to organize researched facts.

Attitudinal Webspiration Survey

The attitudinal survey comprised of eleven Likert-scale type statements. The five ratings ranged from 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly Agree. The Likert-scale addressed two of the three questions asked in this study, which related to student likeability, and usability of the online writing, visual thinking software to foster collaboration.

Results

The Likeability of Webspiration

From the microblogging and social application, **Today'sMeet.com**, positive outcomes for likeability were discovered. The backchanneling online discussions focused on the first guiding question of this study, "What are the student's attitudes towards Webspiration as a likeable tool?" When asked what they liked most about Webspiration, 16 out of 19 students, 84%, indicated they liked working in a group, talking to each other, sharing their ideas which made learning easier, and distributing the workload equally. Three out of the 19 students, 15%, indicated, (a) "I like that it is online and allows us to work as a group (not at the same time) on the same document anywhere at anytime and having it be electronic," and, (b) "I like that it is online and that we can share amongst our group". Surprisingly, a small percentage of students, 3 out of 19, 15%, stated that an online or electronic environment was favorable or necessary.

In contrast, when asked what they liked least about using Webspiration, students indicated, (a) "I don't like how we have to work/edit the document separately and we have to wait for one person to finish instead of doing it all together", (b) "I like that you can have a group. I don't like that it's hard to use because you can't go on all at once", and (c) "I don't like how you have to take turns to edit. It'd be easier if we could all jump on the document at one time, faster too!" 19 out of 19 students, 100%, concurred that they wanted to be able to edit synchronously as a group.

They were also asked, how did it feel to use images and graphics to share your understanding of how your ideas connect to each other. Overall the students felt that using a diagram made it easier to display their knowledge. They also liked that they could see all of their terms and ideas spread out in a web with pictures and definitions. Similarly, when asked, “Do you like your classmates viewing your diagram, web, and/or mindmap,” 63% of the students agreed that it was a good idea for their peers to review their work because other classmates might have a better idea of what could be added to make their webs better.

The Usability of Webspiration

The second guiding question of this study was, “What are the student’s attitudes towards using Webspiration as an effective Web 2.0 tool to foster collaboration?” Figure 1 represents a general summarization of student responses as a percentage of the total responses.

Table 1. Usability field notes and observation questions.

Question	Selected Student Responses	Student percent given
What were the challenges you faced using Webspiration?	Webspiration was difficult and complicated to use because multiple people weren’t able to edit at the same time. It was such a big hassle when collaborating with group members.	52%
	Webspiration was confusing because there were so many steps when trying to open, share, and turn in documents.	47%
What were the challenges you faced when trying to communicate your ideas?	The hardest part was not being able to edit the document as a group.	54%
How could the Webspiration assignment be done differently?	We could have more time on it in class.	47%
	It would be better if everyone could collaborate in real time with their peers.	47%
How did it feel to use diagramming and mindmapping to show your understanding of math concepts?	Students felt that diagramming and webbing was easier to understand because their thoughts, ideas and information were organized “all on one thing” and “all in one place”	58%

Another question asked was, “Do you feel Webspiration is a useful tool to help you learn in school?” Feedback indicated that, 63% of students felt it was useful tool because they could chat with others and add comments like in Google Docs. They expressed the benefits of learning from their peers and getting more out of their webs by reading their peers’ posted comments and chats to get more ideas and remembering content vocabulary.

Likert Attitudinal Webspiration Survey

Table 2 shows mean Likert scores for attitudinal statements. Note that the lowest score was regarding the equality of group contribution. The next lowest scores were related to

the ease of using Webspiration (questions 1 and 7). Lower scores were also in the area of communicating and explaining ideas to a group (questions 3 and 10). Higher scores were also in the area of improved collaboration, peer-reviewed process, and online accessibility (questions 2, 6, and 8). The highest scores related to the tools ability to display how ideas connected and the increase in participation in group work (questions 5 and 9).

Table 3. Webspiration Attitudinal Survey Statements

Statement	Mean (Out of 5)	Standard Deviation
1. Webspiration is easy to learn	3.0	.9
2. I like the fact that the Web 2.0 tool Webspiration is online.	3.4	1.1
3. The concept map helped me explain my ideas to my group.	3.1	.9
4. I felt the entire group contributed equally.	2.8	1.1
5. Using Webspiration increased my participation in my group work.	3.5	1.2
6. Collaboration between my group members improved because of Webspiration.	3.4	1.3
7. Webspiration is easy to use.	3.0	1.2
8. I liked the peer-review process in Webspiration.	3.4	.9
9. I can use Webspiration to share and show my group how my ideas connect to each other.	3.5	1.4
10. Webspiration is an effective Web 2.0 tool to communicate with my peers online.	3.2	1.2
11. Webspiration is an effective visual learning tool to share and show my group how my ideas connect to each other.	3.4	1.2

Students Desire to Repeat the use of Webspiration

When asked how could Webspiration be used for other school subjects, students indicated (a) “Webspiration could be used for English class, to plan an essay, do a rough draft, and to do an outline”, (b) “Webspiration could be used in any other class for group projects. It could also help with outlining, mapping, and brainstorming essays”, and (c) “We could use it to take and organize notes on anything that we learned.” Twenty five percent of the students who participated in the action research project are currently using Webspiration and implementing visual thinking tools in their English course.

Discussion

Overall, students were positively impacted by the implementation of a social mind-mapping tool like Webspiration. Learners functioned as designers, adding and changing information to create their own dynamic knowledge base that continued to grow and form a network of interrelated and interconnected system of ideas. It was fundamental in

helping students plan, organize, and prepare for their multimedia presentation. This technology was used in a fruitful way to guide learners in the organization and representation of what they knew.

In terms of likeability, students were excited and eager to work in a collaborative environment and tinker with new technology. However, the absence of real-time capabilities to simultaneously edit group documents and having to “stand in line” immediately became a major factor in the deterioration of student interest and motivation to further explore other features of this new online tool. Although this was an initial drawback, the students overcame this and delved into the peer review process with gusto. As noted from the open-ended questions and attitudinal survey, students appreciated the constructive feedback to enhance their thinking and learning.

Also significant were the Likert survey findings. The lowest score was regarding the equality of group participation. The combination of limited “tech savviness”, disinterest in technology, group dynamics, and poor group production were factors that affected students’ perception of the effectiveness of Webspiration to foster collaboration. The ease of using Webspiration also earned the next set of low scores. This could be a reflection of the computer challenges that the students experienced. For example, too many steps when opening and sharing documents and difficulty with turning in assignments. Even with the student help resources, not being able to “jump in” and work at the same time may have added to the students’ unwillingness to work in an unfamiliar platform.

In contrast, the highest Likert scores revealed that students felt using Webspiration increased their group participation because they could share and show how their ideas connected to each other. For example, they liked the synchronous and asynchronous chat and comment features, felt the tool was useful to take notes and organize their ideas, and appreciated the constructive feedback to improve their maps. Since the mean was no higher than 3.5, this shows that their responses were widely spread and did not center on one specific area.

Equally noted was the students’ reluctance to embrace the process of using images, graphics, and pictorial models to show evidence of their thinking and understanding. They were required to think harder about the subject matter domain being studied while generating thoughts that would be impossible to display without the visual learning tool. Part of their hesitance stemmed from repetitively mirroring the teachers interpretation or *one* correct view of reality, versus constructing their own knowledge, meaning, and interpretations. The decision-making and planning became the responsibility of the learner. But, in the process of articulating and constructing their own knowledge base they were forced as learners to reflect on what they were studying in a new and meaningful way.

In the end, as the students became more familiar with the landscape of Webspiration, their technical skills improved, as did their final products. As hoped, the English teacher impressively stated that a considerable amount of students that we share are using computer mindtools in class to create webs, diagrams, and concepts maps to enhance

their learning. These students are confident and comfortable working in an electronic environment such as Inspiration and Webspiration to organize their notes and ideas and have begun to apply their 21st century learning skills beyond the math class.

Implications

The researcher highly recommends the use of Inspiration versus Webspiration at this time. Although Webspiration is an online Web 2.0 tool that allows multiple users to edit documents, 100% of the participants found it ineffective in fostering collaboration due to the limitations in real-time group editing. The webbing, diagramming, and concept mapping features are identical to Inspiration, however Webspiration can be confusing when trying to name, share, and turn in documents. Plan to incorporate a substantial amount of instructional minutes to familiarize students with landscape and consider chunking the activities so students do not feel overwhelmed with the number of templates to choose from. Start with an individual activity that requires the learner to share something of personal interest to encourage buy-in. Then extend activities to a pair then end with a group project. More class time and practice on the students part may have increased student motivation and buy-in to explore the other features that we did not have time to use.

Conclusion

Interestingly, and to my surprise student feedback turned out to be the most powerful measuring tool in evaluating the effectiveness of Webspiration. The data indicated that the visual learning tool was ineffective in fostering collaboration due to the lack of instantaneous real-time group editing. Still, participants requested more time in class to familiarize themselves with the tools' many options of webbing, diagramming, concept mapping, synchronous, and asynchronous collaboration. Some students really liked this way of expressing what they knew, while others thought it was difficult. Students who profited from this type of expression are using it independently as they develop their own study habits to organize information in a more meaningful context for themselves. As literature suggested, there still remains a need for social mind-tools that are user friendly, include group editing at the same time, and is effective in facilitating critical thinking in a community of learners in an electronic environment anytime anywhere.

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